

STUDIES IN THE THEACEAE, XXXIV
SOME ASIATIC TAXA OF TERNSTROEMIA¹

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Ternstroemia elongata (Korthals) Koorders, Exkursionfl. Java 2: 611, 1912, *in clavi*, as to name, not as to plant.

Reinwardtia elongata Korthals, Verh. Nat. Gesch. Bot. t. 12. 1840; text p. 103. 1841.

Ternstroemia gedehensis Teysm. & Binn. Nat. Tijdschr. Ned. Ind. 3: 332. 1852.

Ternstroemia gedeensis Teysm. & Binn. Nat. Tijdschr. Ned. Ind. 14: 156. 1857, sphalm. = *T. gedehensis*.

Small tree or shrub with erect, terete, grayish-brown branches; branchlets somewhat subtetragonal or compressed, fasciculate or subfasciculate, grayish brown. Leaves coriaceous, fasciculate, congested at the apex of the branchlets, oblong-obovate or elliptic, 7–14 cm. long, 3–4(–5) cm. wide, acuminate at the apex, cuneate at the base, the margin entire, the

¹ This paper includes eight taxa of *Ternstroemia* for which Dr. Kobuski had written the manuscript (with the exception of the Latin descriptions) prior to the last month of his illness. Before the onset of his difficulties in the fall of 1960 he had begun a revision of the Old World species of *Ternstroemia*, proposing to publish a series of regional studies of this complicated and poorly understood group. He had borrowed specimens from a number of herbaria, had visited important European herbaria in the summer of that year, and had completed a manuscript on the African species which was published in January, 1961. He was able to publish later in 1961 "A Review of the Genus *Ternstroemia* in the Philippine Islands," "Variation in the Fruit of *Ternstroemia kwangtungensis*," and a by-product of his study, "A New Species of *Adinandra* from the Celebes" (all in *Journal of the Arnold Arboretum*, volume 42). He had reached more or less definite conclusions about many of the Asiatic taxa and, at the time of his last hospitalization, was working toward the completion of a manuscript on the species occurring in Sumatra. Failing that, he expressed his desire to publish with a short introduction at least the completed descriptions and notes on *T. patens* and *T. elongata*, which have been confused in the past. These two, along with two new species from Sumatra, two new taxa from the Celebes, a species from Ambon, and one from China, are presented here. With the exception of the manuscript for two additional species, his notes are otherwise only partially complete and are best left un-tampered with. I have attempted only to correlate his descriptions and notes (which were written at various times) and to check the citations of the specimens against those which he had on loan, but with a minimum of alterations in the data which he included. Lily M. Perry has helped greatly with the translation of some of the collection data. With the aid of Bernice G. Schubert and Robert C. Foster in some of the critical parts, I have also provided the necessary Latin descriptions for the three new species, using as models both those which Dr. Kobuski had published and his completed descriptions of two new species of the Lesser Antilles which comprise an additional paper, the thirty-fifth and, most sadly, the last in this series of studies in the Theaceae.—C. E. Wood, Jr.

midrib canaliculate above, elevated below, reddish, the veins obscure on both surfaces, ca. 4 main pairs, arcuate-ascending, generally anastomosing near the margin, the petiole 1.5–2 cm. long. Flowers axillary, disposed near the apex of the branchlets. Stamine flowers: pedicel 1 cm. or less long, recurved; bracteoles 2, opposite immediately below the calyx, deltoid, ca. 1.5 mm. long, 2 mm. wide at the base, flat on the ventral surface, thickened into a median ridge on the dorsal surface, glandular-apiculate at the apex, the margin with a few glands; sepals 5, unequal, the outer two smaller, rounded, ca. 3 mm. long, 2 mm. wide, the margin entire, hardly scarious, the inner three concave, wider than long, 3.25 mm. long, 4.25 mm. wide, the margin subscarious; petals 5, oblong-obovate, recurved, 6.5 mm. long, 3–3.5 mm. wide, subligulate, broadest near the apex, emarginate; stamens 50–55 in a single series, ca. 4.5 mm. long, the filaments joined at the base and adnate to the base of the corolla, distinctly finely filamentous, 3 mm. long, the anthers ca. 1.5 mm. long; ovary none. Pistillate flowers: pedicel, bracteoles, calyx, and corolla as in the stamine flowers, the ovary globose to conico-globose, ca. 2 mm. long, ca. 3 mm. in diameter, 2-loculate, each locule with as many as 6 ovules pendent from the apex, the style ca. 2 mm. long, the stigma 2-punctate. Fruit not seen.

Sumatra. RES. WESTKUST: "Melintang" [Malintang Mts., nne. of Padang], *P. W. Korthals s.n.* (L [908251–987], lectotype); exact locality lacking, *Korthals 1238* (L [908251–988 and –998], probable isolectotypes); exact locality lacking, *Korthals s.n.* (L [908251–990 and –1000], probable isolectotypes); north of Pajakumbuh [Pajakoemboeh] in Harau ravine, 0° 10' S., 100° 40' E., on steep walls of soft tuff stone, alt. 500–600 m., *M. Jacobs 4588* (A, BO, K, L), Aug. 15, 1956 (once seen; shrub 4 m.; leaves dark above, light below; flowers cream; ovary yolk-yellow). RES. BENKOLEN [Benkulen]: Belirang-Sekintjau gebergte [Sekintjau-Belirang Mountains], alt. 1500 m., *F. W. Rappard 62* (A, BO, L, NY), Aug. 12, 1936; Soeban Ajam [Soebanajam], *Ajoeb* (Exped. Jacobson) 271 (BO), July 5, 1916. RES. RIOWU: Indragiri [Inderagiri], Bovenlanden, Moeara Padjanki, in primary forest, few meters alt., *P. Buwalda 6407* (BO, L), Apr. 7, 1939. **Cultivated.** JAVA: "Cult. in hort. Bog." (BO [134748], possible type material of *T. gedeensis*; [134749, 134750], possibly from the same plant); without data except "Teysmann misit 1867" (L [925250–335], possible type material of *T. gedeensis*).

In 1840, illustrations of *Reinwardtia elongata* Korthals and *R. patens* Korthals, representing the two taxa of the new genus *Reinwardtia*, were published. However, the descriptive text for the genus and species did not appear at the same time but in a later fascicle published the following year. The genus *Reinwardtia* retained its identity until 1912, when Koorders, in a key to the flora of Java, transferred *R. elongata* to *Ternstroemia*, making the combination *T. elongata*. Unfortunately, as is clearly shown in Koorders and Valeton, *Atlas Baumarten Java 3: t. 584*. 1915, the material on which the transfer was based belonged to the second species, *T. patens* (Korthals) Choisy. Furthermore, according to my interpretation, and as far as I know, *T. elongata* has been collected growing spontaneously only in Sumatra. Nomenclaturally, the combination *T.*

elongata (Korthals) Koorders is correct, but taxonomically it has been misinterpreted.

Following the original description of *Reinwardtia elongata* the localities were given as "Crescit juxta Doekoe, etc.: SUMATRA." One might expect to find the type in either the Bogor or Leiden herbaria, but at neither institution is there a specimen labeled with the locality Doekoe. However, at Leiden there are five sheets which can be related to the binomial *Reinwardtia elongata* Korth. These specimens were collected by Korthals, and four sheets bear one or two notes in his handwriting. All are either without locality, other than Sumatra, as *Korthals* 1238, or with a locality but without a number, as "Melintang" [= Malintang], *Korthals* s.n. These are obviously the "etc." of the original citation. It is quite evident when examining these specimens and comparing them with the original illustrations (in bud) that these were used for the drawings and description. I have recorded the Malintang specimen as the lectotype, but number 1238 and the two other sheets without collection numbers probably were taken from the same original specimen. One finds often in these earlier collections rather haphazard labeling. Some obviously were not furnished with the original "bits" of paper with the scribbled localities and now possess rather formal labels.

The characters which set off this species are (1) the two-loculate ovary with up to six ovules in each locule, (2) the subulate style (ca. 2 mm. long), and (3) the two-tipped, punctate stigma.

Ternstroemia gedehensis Teysm. & Binn. was described in 1852 from cultivated material growing in Java. It agrees with *T. elongata* in the distinctive characters mentioned immediately above. Possible type material is represented by a specimen in the Bogor herbarium labeled "Ternströmia gedehensis T et B." in Miquel's hand and by one at Leiden (no. 925250-335) which was sent by Teysmann.

***Ternstroemia patens* (Korthals) Choisy, Mém. Soc. Phys. Hist. Nat. Genève 14: 107 (Mém. Ternstr. 19). 1855; in Miq. Fl. Ind. Bat. Suppl. 1: 476. 1862.**

Reinwardtia patens Korthals, Verh. Nat. Gesch. Bot. t. 12. 1840, text p. 102. 1841.

Shrub or small tree, up to 5 m. high; branchlets smooth, quite terete, reddish brown, often subverticillate. Leaves thin-coriaceous, subverticillate, near the apex of the branchlets, obovate, abruptly acute at the apex, tapering at the base, usually 7-11 cm. long, 3-4 cm. wide (rarely up to 18 × 7 cm.), the veins 3 or 4 pairs (5 or 6 pairs on largest leaves), arching upward and anastomosing near the entire margin, the petiole usually less than 1 cm. long. Flowers axillary. Stamine flowers: pedicel 1.5-2.5 cm. long; bracteoles 2, alternate, quickly caducous, the upper bracteole scar 3-5 mm. below the calyx, the lower bracteole scar 5-7 mm. below the calyx; sepals 5, imbricate, unequal, the outer two smaller, rounded, 2-2.5 mm. long, 2.5-3 mm. wide, the inner three 3 mm. long, 3 mm. wide,

the margin scarious or subfimbriate; petals 5, obovate, lightly unguiculate, rounded at the apex, 7.5–8 mm. long, 5–6 mm. wide. Stamens numerous, ca. 85, ca. 3 mm. long, in three or more series; filaments flattened, ca. 1 mm. long, connate entire length, free from the petals; anthers linear, ca. 2 mm. long, each anther locule subtruncate at apex; pistillodium mound-like, 5-ridged, sterile. Pistillate flower: bracteole scars and calyx as in staminate flower, the bracteoles rarely seen, linear, ca. 1 mm. long, ca. 0.5 mm. wide; petals not seen; staminodium not seen (if present, falling with petals); ovary glabrous, ovoid, ca. 3 mm. long, 2 mm. in diameter at base, one-loculate, with a single pendulous ovule; style very short or none; stigma peltate or disciform, 2-lobed, the margin pendulous, irregularly scalloped or incised. Fruit ovoid, ca. 2 cm. long, 1.3–1.5 cm. in diameter near base, orange, with very thin pericarp (ca. 0.25 mm. thick), still crested by the minute peltate stigma. Seed solitary, hippocrepiform, ca. 1.5 cm. long, 1 cm. wide, covered with a red-orange aril.

Sumatra. RES. WESTKUST: precise locality lacking, *P. W. Korthals s.n.* (L [908251–984, lectotype; 908251–986, probable isolectotype]); Padang, "Sungei bulu" [Sungei Balu], at sea level, *O. Beccari 904* [transcribed on label as 902] (L), 939(L), Sept. 18, 1878; Priaman [Pariaman?], Dalik badak, *H. Diepenhorst 2150 H B* (BO, L); Priaman, *J. E. Teysmann s.n.* (A, BO, L). RES. RIOWU: W. Indragiri [Inderagiri], Taluk [Taloek] Region, Hutan Pulau Lawas, near Taratak Air Hitam, on flat sandy soil of lowland forest of Dipterocarpaceae, *W. Meijer 4365* (L), Jan. 16, 1956 (shrub with orange fruit, seeds carmine-red). RES. BENKOELAN [BENKULAN]: Enggano Island, Malakoni, near the river Malakoni, in forest, *W. J. Lütjeharms 4842* (A, BO, L), June 20, 1936 (small tree, ± 5 m. high). Without locality: *Teysmann* (L [908251–985]).

Java. PROV. MID. JAVA: Res. Banjoemas [Banjumas], Subdivision Tjilatjap, Noesa Kambangan, *S. H. Koorders 1901B* (BO, L), Dec. 10, 1891; same locality, *Koorders 9997B* (L), Dec. 7, 1891. PROV. W. JAVA: Bantam, in mountain forest, *C. L. Blume s.n.* (L [908251–995]); without locality but apparently parts of the preceding collection, *Blume s.n.* (L [908251–989 and –999]).

From the specimens examined, this species appears to be confined to the islands of Sumatra and Java. It is very distinct from all other species of *Ternstroemia* in this area. The fruit, with its single locule and single seed, probably was the basic character on which Korthals based his new genus *Reinwardtia*. This character alone separates it from all other taxa of *Ternstroemia* in the Eastern Hemisphere. The very thin pericarp is also most unusual in the genus. A single sheet (apparently from Java) in the Leiden herbarium (no. 908251–982), the collector unknown to me, has a drawing and a brief description attached. Dissections of the fruit on this specimen show that the author-artist mistook the conduplicate character of the seed for a bilocular, two-seeded fruit.

In the above description, the staminodium of the pistillate flowers is mentioned as "not seen (if present, falling with the petals)." There is a brief disc-like area surrounding the pistil which causes the author to believe that a staminodium may have been present. The base of the staminodium may have been adnate to the base of the corolla, a character-

istic usually found in this genus. However, in the staminate flower of this taxon the stamens are free from the base of the corolla, which is not the usual finding.

Korthals in his original description refers to the stigma as "decem sulcatum." I could not duplicate this observation. I found the stigma to be irregularly scalloped, but not necessarily in tens.

As with his *Reinwardtia elongata*, Korthals gave the original locality as Doekoe, noting that both species were growing in forests a little above sea level. No specimens of *Ternstroemia patens* with this locality are present in either the Bogor or Leiden herbaria, but at Leiden there are two collected by Korthals which match well the original illustration of *Reinwardtia patens* which was almost certainly based at least in part on this material. One of these specimens labeled as *Reinwardtia patens* by Korthals is chosen as lectotype; the other, which bears a small label with "Nieuwlandia littoralis" in Korthal's hand and another with "Reinwardtia patens Krths." in Blume's is apparently from the same plant.

It is this taxon that Koorders incorrectly called *Ternstroemia elongata* in making the transfer from *Reinwardtia* to *Ternstroemia*. This was an unfortunate error which has caused considerable misunderstanding about the two species *T. elongata* and *T. patens*.

Ternstroemia foetida, spec. nov.

Tree 10–18 m. high; branchlets terete, very light gray, thick (7–10 mm. in diameter), with conspicuous large leaf and flower scars. Leaves subcoriaceous, oblong-obovate to oblong-elliptic, 20–35 cm. long, 7–10 cm. wide, acuminate at the apex, cuneate at the base, tapering into a sturdy petiole 1–2 cm. long, the midrib impressed above, elevated below, the margin entire, the primary veins ca. 13 or 14 pairs, occasionally branching, anastomosing near the margin, secondary veins occasional. Flowers bisexual, solitary; pedicel sturdy, ca. 3 cm. long, curved or straight at the apex, 4–5 mm. in diameter at the base; bracteoles 2, subopposite ca. 5 mm. below the calyx, quickly caducous, broadly linear, 8–10 mm. long, 4 mm. wide, rather thick through the center, thinning along the margin; sepals 5, thick through center and at base, entire, unequal, the outer ones broadly ovate, ca. 10 mm. long, 9–10 mm. wide, the inner ones rounded, 13–15 mm. long, 13–14 mm. wide, scarious at the margin; petals 5, large, concave, thickened (fleshy) in center, unequal, the outer ones broadly ovate, ca. 23 mm. long, 19–23 mm. wide, the inner ones rounded, 25–28 mm. long, ca. 25 mm. wide; stamens numerous, ca. 250, 5 or more seriate, very crowded, unequal, rising from a disk 10 mm. in diameter, the outer ones ca. 12 mm. long, concave, adnate to only the inner petal at the base, the filaments 3 mm. long, thin, broad as anthers, the anthers ca. 6 mm. long, projection flat, as wide as anthers, 2 mm. long, blunt at apex, the inner stamens ca. 8 mm. long, filaments fused, negligible in length, anthers 6 mm. long, the projection 2 mm. long; ovary ca. 5 mm. long, 3.5 mm. in diameter, 2-loculate with 2 pendent ovules in each locule; style thick, 4–5 mm. long,

split nearly the whole length (3 mm.), each part branched two or three times, then rebranched with the sub-branches topped by a peltate arrangement of ruffled overlapping stigmas. Fruit rounded, 5 cm. long, 3.5 cm. in diameter, with persistent styles, 2-loculate, each locule 2-seeded; pedicel sturdy, as much as 7 mm. in diameter at the apex. Seeds large, elongate, 2.6 cm. long, 1 + cm. wide, covered with an oily aril.

Arbor 10–18 m. alta, ramulis teretibus, griseis, crassis (7–10 mm.). Folia subcoriacea, oblongo-obovata vel oblongo-elliptica, 20–35 cm. longa, 7–10 cm. lata, apice acuminata, basi cuneata in petiolis crassis 1–2 cm. longis attenuata, margine integerrima; costa supra canaliculata, subitus elevata; venis primariis ca. 13 vel 14 paribus. Flores bisexuales, solitarii; pedicellis ca. 3 cm. longis, basi 4–5 mm. diametro; bracteolis 2, suboppositis, caducis, late linearibus, 8–10 mm. longis, 4 mm. latis; sepalis 5, inequalibus, margine integerrimis, exterioribus late ovatis, ca. 10 mm. longis, 9–10 mm. latis, interioribus rotundatis, 13–15 mm. longis, 13–14 mm. latis, margine scariosis; petalis 5, magnis, concavis, inaequalibus, exterioribus ca. 23 mm. longis, 19–23 mm. latis, interioribus 25–28 mm. longis, ca. 25 mm. latis; staminibus ca. 250, 5 vel plus seriatis, inaequalibus, e disco 10 mm. diametro, exterioribus ca. 12 mm. longis, concavis, basi ad petalum interiore adnatis, filamentis 3 mm. longis, antheris ca. 6 mm. longis connectivis apice truncatis 2 mm. projectis, staminibus interioribus ca. 8 mm. longis, filamentis paene in toto coalitis, antheris 6 mm. longis connectivis 2 mm. projectis; ovario ca. 5 mm. longo, 3.5 mm. diametro, 2-loculato, loculis 2-ovulatis, ovulis pendulis; stylo crasso, 4–5 mm. longo, paene in toto diviso (3 mm.), partibus 2- vel 3-ramosis, deinde in ramulis ordinis tertii divisis, his stigmatibus peltatis imbricatis coronatis. Fructus 5 cm. longus, 3.5 cm. diametro, stylis persistentibus, 2-loculatus, loculis 2-seminatis, pedicello crasso apice 7 mm. diametro. Semina magna, elongata, 2.6 cm. longo, 1 + cm. lata, arillata.

Sumatra. GOUVT. ATJEH: Simulue [Simaloer, Simalur, Simeuloeë] Island: "Eil Simaloer," *Achmad* 395 (A, BO, L), Apr. 24, 1918; *Achmad* 520 (A, BO, L), July 5, 1918; *Achmad* 621 (BO [135060], holotype; A, BO [135061], L [922,70–392 and –406], isotypes), Sept. 15, 1919 (10 m. high, crown 7 m. diam.). Tapah Island: "Landschap Tapah (Dèfajan)," *Achmad* 1518 (A, BO, L), Nov. 24, 1919.

Although only four collections of this unusual species were available for study, the number of duplicates found at the Arnold, Bogor, and Leiden herbaria numbered over twenty. Ample material of both flowers and fruit was available. It appears that the taxon is limited in distribution to the two small islands of Simulue (note variant spellings) and Tapah off the northwestern coast of Sumatra.

The two features of this species which are immediately noticeable are the unpleasant odor and the generally large size of the stem, leaves, flowers, and fruit. The objectional odor is not unusual in the genus. Dr. Kostermans, of Bogor, had told me earlier that while collecting in Indonesia he was able to detect the presence of members of the group at quite a distance

by the odor. The leaves measure up to 35 cm. in length. However, in most of the specimens examined the average length is 20–25 cm. The flower parts are all large and quite fleshy. Especially noticeable are the petals, which, as far as I can determine, never open flat but continue concave. Only the stamens opposite the inner petal appear to be adnate to the corolla, which is different from most species of the genus. The filaments of the outer row of stamens appear to be joined the whole length in a sort of collar. They are quite thin but equal or nearly so to the width of the anther. The filaments in the inner rows are so fused that they appear as a single mass and cannot be separated. Accommodating this arrangement of filaments for so large a number of stamens (250) is a disk about a centimeter in diameter (including the pistil).

The ovary is quite typical of the genus. The style is sturdy, measuring five millimeters or less, and is split in two nearly to the base. In the fruit the two parts are entirely separated. Each portion of the style branches several times and is finally topped by a circular peltate stigma consisting of the combined ruffled, overlapping surfaces of the several stigmas.

Ternstroemia palembangensis, spec. nov.

Small tree 15–18 m. tall; branchlets terete, thick, light gray-brown, with large leaf scars. Leaves large, coriaceous, oblong-obovate, 20–35 cm. long, 8–10 cm. wide, acuminate at the apex, long-cuneate at the base, tapering into a thick petiole ca. 1 cm. long, the midrib impressed above, elevated below, the primary veins 10–12 pairs, anastomosing near the entire margin. Buds tight, globose, ca. 1 cm. across, very hard, difficult to dissect. Flowers bisexual; pedicel 2–2.5 cm. long, straight, erect; bracteoles 2, opposite ca. 3 or 4 mm. below the calyx, linear, ca. 3 mm. long; sepals green, unequal, grading gradually from outer to inner, the outermost broadly ovate, acute at the apex, 4 mm. long, 4.25 mm. wide, the innermost unguiculate, rounded at the apex, 9 mm. long, 10 mm. wide, the claw 4.5 mm. wide; petals fleshy, ivory white, the outermost nearly 2 cm. long; stamens numerous, ca. 150, 4-seriate, dirty white, ca. 5 mm. long, the filaments free, 1.5 mm. long, flattened, as wide as anthers, the anthers ca. 3.5 mm. long, the projection less than 1 mm. long, deltoid to a point, the projections tending to stick together; disk 8 mm. across; ovary long-conical, ca. 10 mm. long, tapering into the entire style ca. 3 mm. long, 2-loculate, probably with two pendent ovules in each locule (only a single ovule seen in one locule); stigmas 2, linear and undulating (almost threadlike) in bud, linear at anthesis and coiled back. Fruit ovoid, 4 cm. long, 3 cm. in diameter, terminating in a strong beak ca. 5 mm. long formed from the persistent style, 2-loculate, each locule 2-seeded; calyx persistent, appearing fused at base into a single unit. Seeds large, 2.5 cm. long, 1.5 cm. wide.

Arbor 15–18 m. alta, ramulis teretibus, crassis, griseo-brunneis. Folia magna, coriacea, oblongo-obovata, 20–35 cm. longa, 8–10 cm. lata, apice

acuminata, basi cuneata in petiolis crassis 1 cm. longis attenuata, margine integerrima; costa supra canaliculata, subitus elevata; venis primariis 10–12 paribus. Flores bisexuales; pedicellis 2–2.5 cm. longis, erectis; bracteolis 2, oppositis, linearibus, ca. 3 mm. longis; sepalis viridibus, inequalibus, exteriori late ovato, apice acuto, 4 mm. longo, 4.25 mm. lato, interiori unguiculato, apice rotundato, 9 mm. longo, 10 mm. lato; petalis carnosis, exteriori ca. 2 cm. longo; staminibus ca. 150, 4 seriatis, ca. 5 mm. longis, filamentis liberis, 1.5 mm. longis, antheris ca. 3.5 mm. longis, connectivis deltoideis minus quam 1 mm. longis; disco 8 mm. diametro; ovario longe conico, ca. 10 mm. longo, 2-loculato, loculis probabiliter 2-ovulatis; stylo ca. 3 mm. longo; stigmatibus 2, in alabastro linearibus undulatis, anthesin linearibus recurvatis. Fructus ovoideus, 4 cm. longus, 3 cm. diametro, perrostratus, rostro ca. 5 mm. longo ex stylo persistente, 2-loculatus, loculis 2-seminatis; sepalis persistentibus basi connatis. Semina magna, 2.5 cm. longa, 1.5 cm. lata.

Sumatra. RES. PALEMBANG: "Ond. Afd. Banjoeasin en Koeboestreken bij Bajoenglintjir" [Subdivision Banjuasin and Kubu region near Bajunglintjir; ca. 165 km. nw. of Palembang], alt. 15 m., *L. J. W. Dorst* 69T-1P-125 (BO [135020], holotype; BO [135018, 135019], L [922253–245], isotypes), buds collected Nov. 13, 1920, flowers Feb. 27, 1921; "Ond. Afd. Banjoeasin en Koeboestreken," *A. Thorenaar* 69T-1P-125 (BO), June 15, 1921; same locality and altitude, *C. J. van der Zwaan* 69T-1P-125 (BO), Aug. 6, 1922; same locality, alt. 20 m., *W. Grashoff* 817 (BO, L), fruit, Nov. 15, 1915.

This new species appears to be most closely related to *Ternstroemia foetida* in its very large leaves and large flowers and fruit. Both have sturdy pedicels with rather large linear bracteoles located a few millimeters below the calyx. In *T. foetida*, however, the smallest calyx lobe (10 mm.) is longer than the largest 9–10 mm.) found in the present species. The stamens are also more numerous (250+) and are arranged in more series (five or more). The filaments, except for those of the outer series, are negligible in length and cannot be separated, and the projection is broad and flat at the apex. The style of *T. foetida* is two-parted nearly its entire length, branching and rebranching and topped by a peltate arrangement of overlapping stigmas. The fruit is rounded, topped by the persistent style and stigma.

In *Ternstroemia palembangensis* the filaments are 1.5 mm. long and free their whole length. The projection is distinctly deltoid. The style is entire at first, later splitting and topped by filiform stigmas. The ovary and fruit are long-conical. The persistent style splitting slightly forms a definite beak to the fruit.

Ternstroemia kjellbergii, spec. nov.

Tree 3 m. high; branchlets terete, thick, 6–7 mm. in diameter. Leaves large, coriaceous, oblong-obovate, 25–32 cm. long, 11–14 cm. wide, rounded at the apex, abruptly apiculate, cuneate at the base, the midrib deeply canaliculate above, very prominently elevated below, the primary veins 12–16 pairs, occasionally branching, conspicuous below, anastomosing

near the margin, the petiole crassate, as much as 5 mm. in diameter, 2 cm. long. Flowers not seen. Fruiting pedicel ca. 3.5 cm. long, thick, ancipitous; bracteoles 2, caducous, the scars subopposite below the calyx; sepals subequal, the outer two narrower, all rounded at the apex, ca. 10 mm. long, 8 and 11 mm. wide, joined at the base up to 5 mm. Fruit oblong, 4 cm. long, ca. 2 mm. wide, topped at the apex by a broken style, 2-loculate, each locule 2- or 1-seeded, the locules not occupying the whole fruit but measuring only 2 cm. long near the apex, the lower half of fruit represented by a pyramidal mass of spongy, undifferentiated tissue tapering into the central thickening between the walls of the locules. Seeds quite black when dried, hippocrepiform, ca. 1.8 cm. long, 1 cm. wide, covered with a darkened aril.

Arbor 3 m. alta, ramulis teretibus, crassis, 6-7 mm. diametro. Folia magna, coriacea, oblongo-obovata, 25-32 cm. longa, 11-14 cm. lata, apice rotundata subito apiculata, basi cuneata; costa supra canaliculata subtus prominenter elevata; venis primariis 12-16 paribus; petiolo crasso ad 5 mm. diam., 2 cm. longo. Flores non visi. Pedicellus fructiferus ca. 3.5 cm. longus, crassus, ancipitus; bracteolis 2, suboppositis caducis; sepalis subaequalibus 2 exterioribus angustioribus, omnibus apice rotundatis, ca. 10 mm. longis, 8 et 11 mm. latis, basi connatis ca. 5 mm. Fructus oblongus, 4 cm. longus, 2 cm. latus, apice coronatus stylo fracto, 2-loculatus, loculis 2- vel 1-seminatis, loculis ad apicem fructus, loculis tantum 2 cm. longis, dimidio inferiore fructus textu spongioso pyramidali, attenuato inter loculos. Semina nigra in siccis, hippocrepiformia, ca. 1.8 cm. longa, 1 cm. lata, arillata.

Celebes. CENTRAL CELEBES: Lelewao [Lelewaoe] Distr., Preho, tropical rain forest, alt. 600 m., G. Kjellberg 2517 (s, holotype; BO [134991], isotype), Oct. 15, 1929.

This taxon differs from all others found in the Celebes in the extremely large leaves, the rounded apex of which is sharply prolonged into an apiculate extension. The fruit in the dried state appears quite oblong, but in the fresh condition the diameter may register larger (by as much as a centimeter) than is recorded above. The inner structure of the fruit varies considerably from that found in the other species of the genus which I have examined. Ordinarily the seeds and the locules which contain them occupy the whole structure of the fruit. In this taxon the locules and seeds are confined to the upper half of the fruit. In the lower half below the seeds one finds an unusual pyramidal mass of spongy tissue which tapers at the apex into the center thickening which is found between the inner walls of the locules. Considering the overall size of the fruit, the seeds are unexpectedly small.

Ternstroemia urdanatensis var. *crassifolia*, var. nov.

A typico *T. urdanatense* differt foliis crassis, 5-6 cm. longis, 2-2.5 cm. latis, venis 5-7 paribus, supra impressis, subtus obscuris.

Celebes. SW. CELEBES: Onderafdeeling [Subdivision] Enrekang, Pokapindjang [one of the Latimodjong Mountains], alt. 2800 m., *P. J. Eyma* 613 (A, holotype; BO [134979], L [951166-220], isotypes), June 16, 1937 (fruit wine-red).

Like *Ternstroemia urdanatensis* (Elmer) Kobuski var. *urdanatensis* (see description in *Jour. Arnold Arb.* 42: 268. 1961), this variety is characterized by a globose fruit (ca. 9 mm. long and 10 mm. in diameter) topped by a short style (2 mm. long) and a two-parted punctate stigma. In each locule of the fruit were found eight to ten small seeds so crowded that several were misshapen. Of these seeds, probably only four to six would develop to maturity in each locule. The seeds measured 4 mm. long by 3 mm. in diameter and were covered by a mealy aril, bright in color, probably orange or red.

Since this taxon was observed as a single fruiting collection, I do not designate the relationship with *Ternstroemia urdanatensis* with any certainty. The leaves vary from those of the typical variety in their thickness and impressed veins on the upper surface. It may be that when flowers are found and examined this taxon will prove to be specifically distinct.

***Ternstroemia robinsonii* Merrill**, *Interp. Rumph. Herb. Amboin.* 3: 369. 1917.

Ichthyocetos montana Rumphius, *Herb. Amboin.* 3: 214, t. 139. 1743.

Tree 15-20 m. high; branchlets thick (8-10 mm. in diameter), reddish brown, occasionally grayish brown, striate in the dried stage, interrupted by large leaf scars; leaves congested at the apex of the branchlets, oblong-obovate, 15-25 cm. long, 5-9 cm. wide, deep purple-brown when dried, thick-coriaceous, the apex obtusely acuminate, cuneate at the base, the midrib canaliculate above, elevated beneath, the veins 15-20 pairs, curving upward near the apex but not anastomosing, the petiole stout, ca. 1 cm. long. Mature flowers not seen. Pistillate bud ca. 1 cm. across; pedicel sturdy, 1.5 cm. long, 0.5 cm. in diameter; bracteoles 2, opposite, quickly caducous, the scars ca. 4-5 mm. below the calyx; calyx-lobes unequal, the outer two rounded 7×9 and 8×8 mm., the inner three unguiculate, 8-11 mm. long, ca. 11 mm. wide at the upper portion, 5 mm. wide below, all lobes much thickened and joined at the base into a wide, shallow tube; corolla lobes inseparable in the tight bud; staminodia in four series at base of the ovary, \pm 200, deltoid, ca. 1 mm. long; ovary broad, flattened dome-shaped, 2 mm. high, 3-5 mm. across, 2-loculate, each locule 2-ovulate, the ovules pendent from apex of the locule; style short, thick, 1 mm. or less long, two-parted, each part three-branched, each branch topped by a broad, spreading stigma as much as 3 mm. across with undulate margin. Fruit ellipsoid to rounded, 5-6 cm. long, 4-5 cm. wide, bright red when fresh, brown when dried, two-loculate, each locule two-seeded; fruiting pedicel ca. 2.5 cm. long, spreading at the apex into the broad, persistent,

much-thickened, rugose calyx measuring 2.5–3 cm. across. Seeds 3–4 cm. long, 2–3 cm. across, covered with a dense, red, mealy aril.

Moluccas. AMBON (Amboina): Hitoe messen, in forests, alt. 350 m., *C. B. Robinson* (*Pl. Rumph. Amb.*) 275 (GH, lectotype; BO [134825], L [920191–385], isotypes), Oct. 18, 1913; Hitoe besar, alt. 280 m., *Neth. Ind. For. Serv. bb 10135* (*F. de Bell 8*) (BO), June 26, 1926; Waai, alt. 100 m., *Neth. Ind. For. Serv. bb 25979* (*P. Buwalda 634*) (A, BO, L), Sept. 26, 1938.

Up until now, *Ternstroemia robinsonii* has been known only from fruit. The pistillate structures enumerated above have been drawn from the dissection of a single flower bud. The measurements, of course, will not hold for the mature opened flower, when encountered, but the basic morphology has been made available for comparison with other species.

This species shows a great resemblance to *Ternstroemia philippinensis* in size of flower, fruit, and leaves. However, in *T. philippinensis* the thickening at the base of the fruit is between the fruit and the calyx-lobes, whereas in the present species the thickening is found below the calyx-lobes. Also, the calyx-lobes in *T. philippinensis* are all rounded, although similar in size to those of *T. robinsonii*, in which the thick inner lobes are unguiculate. In *T. philippinensis* the style is longer and sturdier and often persists in the fruit, giving the appearance of a double beak. The stigma is never persistent. In the present species, when persistent, the style is so short that the stigmata often continue into the mature fruit, lying flat at the apex of the mature structure.

Since the original holotype no longer exists because of the destruction of the Philippine herbarium during the war, the duplicate deposited in the Gray Herbarium has been designated as the lectotype.

In studying the description and crude illustration of *Ichthyocitonos montana* Rumphius, published in 1743, I agree with Merrill that they correspond closely enough to represent this species. However, I do not agree that *Ichthyocitonos litorea silvestris latifolia*, described immediately preceding *I. montana*, belongs here. The serrate or undulate leaf, the obvious style, and the size of the fruit, along with the shape of the terminal bud, remind one more of *Adinandra* or *Eurya*.

The range of this species may extend to the adjacent island of Buru (Boeroe). Four sterile specimens appear to belong here. Three collected by *P. S. P. Oersipuny* (167 [*Neth. Ind. For. Serv. bb 22825*]) at Kak Toea, alt. 800 m., 24 May 1937 (A, BO, L), resemble *Ternstroemia robinsonii* very much. A fourth specimen (*L. J. Toxopeus 491* [BO-134826]), collected at Fakal, at an altitude of 1250 m., September 1, 1921, is less carefully preserved and is mentioned here without too much assurance.

Ternstroemia nitida Merrill, Jour. Arnold Arb. 8: 10. 1927.

Small tree, 7–12 m. high; branches and branchlets terete, fairly smooth, brownish gray. Leaves disposed near or at the end of the branchlets, chartaceous to thin-coriaceous, shiny, oblong-elliptic to oblong-obovate, 6–10 cm. long, 2.5–4 cm. wide, acuminate at the apex, cuneate at the base, the

midrib canaliculate above, elevated below, primary veins 5–7 pairs, somewhat obscure, arching upward and anastomosing near the margin, secondary veins occasional, the petiole 1–1.5 cm. long. Plants dioecious. Staminate flowers axillary, solitary; pedicel unusually slender, tenuous, 1–2 cm. long; bracteoles 2, opposite, immediately below the calyx, minute, deltoid, 2 mm. long, 1.7 mm. wide at the base, sharply pointed at the apex, with few (2 or 3) glandular denticulations along the margin; calyx-lobes unequal, the two outer lobes ovate, 3–4 mm. long, ca. 3 mm. wide, the margin entire, the three inner lobes ovate, rounded at the apex, 5–6 mm. long, ca. 4 mm. wide, the margin scarious; corolla-lobes obovate, somewhat concave, 5–7 mm. long, 4–5 mm. wide near the apex, rounded at the apex, joined lightly at the base; stamens unisexual, ca. 35, unequal, 3.5–4.5 mm. long, the filaments 1–2 mm. long, joined at the base and adnate to the base of the corolla, the anthers 2–2.5 mm. long; pistillodium flat, undeveloped, with a pseudostyle projected 1 mm. upward. Pistillate flowers not seen. Fruit ovoid to obpyriform, recurved, purple, ca. 1 cm. long, 0.8 cm. in diameter, 2-loculate, each locule with a single seed pendent from the apex of the locule; fruiting style usually partly broken off, occasionally intact, 3–4 mm. long, usually two-parted at the apex for 1 mm., often appearing entire (line of separation visible under the lens), the stigmas two, subpeltate or peltate (?). Seed hippocrepiform, tawny in color, 5–6.5 mm. long, 4–5 mm. in diameter, covered with a tawny colored aril.

China. KWANGTUNG: Lung T'au Mountain, right side of Iu village, forest in K'i ravine, *Canton Christian College no. 12590* (To, Tsang & Tsang—Wulsin Exped.) (us, holotype [fide L. B. Smith]; A, BM, isotypes), June 26, 1924 (tree 12 m.; flowers white, fragrant). KIANGSI: S. Kiangsi, Tai Au Hong, sw. of Sungwu, above stream in forest, alt. 550 m., *J. L. Gressitt 1596* (A), July 5, 1936 (tree with orange flowers); Kiennan Distr., Sai Hang Cheung, Tung Lei village, in thicket along stream on a dry, gentle loam slope, *S. K. Lau 4061* (A), Aug. 1934 (woody; 7 m. high); Lungnan Distr., Oo Chi Shan, near Lam Uk Tung village, on dry, steep, clay slopes in forest, *S. K. Lau 4501* (A), Sept. 16–30, 1934 (rare, woody, 5 m. high); Yi-feng, Tung-ho, Hwang-kan Shan, in woods along stream, *Y. K. Hsiung 6460* (A), Oct. 15, 1947 (common tree). CHEKIANG: south of Pang Yung, in woods, *R. C. Ching 2063* (A, K, paratype collection), July 11, 1924 (fairly common, small tree, 10 m.). ANHWEI: S. Anhwei, east Wu Yuan, on open, rocky stream bank, alt. 600 m., *R. C. Ching 3314* (A, K), Sept. 4, 1925 (rare, low shrub, 1.5 m.; with evergreen, pale, shiny leaves; fruit nodding, purplish in color). KWANGSI: Lien Chuen Distr., along stream in woods, *Z. W. Chung 83702* (A), Sept. 9, 1937 (tree); Kwei-lin Distr., Chin-kang Shan, Ta-chiang-yuan and vicinity, in swampy thickets, *W. T. Tsang 28262* (A), Sept. 1–17, 1937 (fairly common, woody, 3 m. high).

This species is easily recognized by two very unusual and obvious characters: its disagreeable odor and slender pedicels. All of the parts (leaves, flowers and fruit) give off a strange, obnoxious odor, easily recognized at quite a distance in herbarium specimens. When material for dissections is being boiled up, the strong odor will pervade the halls and rooms nearby. The only other species studied so far with a similar odor

is *Ternstroemia foetida*, quite unrelated in other characteristics to *T. nitida* and confined solely to the islands of Simulue and Tapah, off the northwestern coast of Sumatra.

The flowers and fruit are both very small for the genus. The fruit, measuring only ca. 1 cm. in length, is purplish in color and quite ovoid in shape. Each of the two locules is single seeded. The style, which remains intact in the fruit, is quite long (3-4 mm.) in comparison with the size of the fruit and is usually two parted for a third of its length at the apex. When not separated, the two "separating" parts of the style are obvious under a hand lens. It is difficult to designate accurately the shape of the stigma from the dried-up stage found on the fruit. It appears to be subpeltate, but to what extent, one cannot be certain. The pistillate flower, although not seen in this study, can almost be reconstructed from the fruit, with the exception of the stigma and the presence of a staminodium or stamens. The pedicels are very slender, almost threadlike, recurved by the weight of the fruit.